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Dendrolobium (Leguminosae-Papilionoideae: Desmodieae) in the Philippines

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Dendrolobium in the Philippines is revised. Four distinct species are recognized, including one new species: *Dendrolobium cumingianum* Benth., endemic to Luzon Island, *D. geesinkii* H.Ohashi endemic to Luzon and Samar Islands, *D. quinquepetalum* (Blanco) Merr., confined to Luzon and Mindoro Islands, and *D. umbellatum* (L.) Benth., pantropic on seashores of the Old World. A key to the species and descriptions of the genus and species are provided.

Dendrolobium is characterized by having a solitary flower per node in the inflorescence, no secondary bracts, white or sometimes pale yellowish flowers, a long-clawed standard, monadelphous stamens, thick-walled pods without hooked hairs, distinct rim-arillate seeds, well developed stipules often connate at the base on the side opposite the petiole, and coarsely reticulate pollen grains. In comparison, *Desmodium*, which has often been treated as including *Dendrolobium* (e.g., Verdcourt 1979, Sanjappa 1992), does not exhibit all or most of these characteristics in one species, except for a few characteristics in some species. *Dendrolobium* and *Desmodium* are, therefore, better treated as distinct.

The first species of *Dendrolobium* recorded from the Philippines was *Dendrolobium cumingianum* Benth., which was one of the four species enumerated by Bentham (1852) when he established the genus. Merrill (1910, 1923) recorded three species of the genus under *Desmodium* as members of section Dendrolobium: *Desmodium cumingianum*, *D. quinquepetalum* and *D. umbellatum*. Van Meeuwen (1962) recognized two of the three as distinct: *D. quinquepetalum* and *D. umbellatum*, and regarded *D. cumingianum* as a synonym of the latter. Ohashi (1973) treated the former two species under *Dendrolobium*, and later revived *Dendrolobium cumingianum* as a distinct species (Ohashi 1997a). *Dendrolobium quinquepetalum* is recognized as species endemic to the Philippines (Ohashi 1997b). Recently, an unknown plant of *Dendrolobium* was found in the Philippines and is considered to be a new species. In this paper, *Dendrolobium* of the Philippines is revised, the new species is described and a new key to the species is provided.

Materials and Methods

This study is based mainly on critical examination of herbarium specimens kept in A, BM, BO, CAL, CAS, GH, K, KAG, L, MO, NY, PNH, SING, TAI, TI, TUS, UC, UPS, and US. Abbreviations of the herbaria are according to Holmgren et al. (1990). Field work was undertaken in Luzon, the Philippines, in 1993. The following abbreviations are used for citation of specimens: B.S. = Bureau of Science No.; F.B. = Forestry Bureau No.; PNH. = Philippine Natural History Museum No.

Taxonomic treatment

Dendrolobium (Wight & Arn.) Benth. in Miq., Pl. Jungh. 215 & 216 (1852); Schindl. in Repert. Spec. Nov. Regni Veg. **20**: 278 (1924); Hutch., Gen. Fl. Pl. **1**: 483 (1964); Ohashi in Ginkgoana **1**: 50 (1973); Huang & Ohashi in Fl. Taiwan **3**: 248 (1977); Ohashi, Polhill & Schubert in Adv. Leg. Syst. **1**: 299 (1981); Huang & Ohashi in Fl. Taiwan ed. 2, **3**: 242 (1993); Dy Phon in Dy Phon, Ohashi & Vidal, Fl. Camb. Laos Viet. **27**: 8 (1994); Yang & Huang in Fl. Reipubl. Pop. Sin. **41**: 3 (1995); Pedley in Rev. Fl. Ceylon **10**: 162 (1996).

Desmodium subgen. Dendrolobium Wight & Arn., Prodr. **1**: 223 (1834).

Desmodium sect. Dendrolobium (Wight & Arn.) Benth. in Benth. & Hook. f., Gen. Pl. **1**: 519 (1865); Merr. in Philip. J. Sci. Bot. **5**: 80 (1910); van Meeuwen in Reinwardtia **6**: 256 (1962).

Shrubs to trees, to 6 m tall, or subshrubs; leaves petiolate, 3-foliolate or rarely 1-foliolate; stipules connate on side opposite the petiole or free; stipels persistent. Inflorescences axillary or terminal and axillary, axillary inflorescence umbellate or short racemose, rarely elongate racemose, terminal inflorescences compound paniculate or compound racemose, with one umbel per node; flowers uniparous, with bract at base, without secondary bracts, bracteoles conspicuous at tip of pedicel. Calyx 4- or rarely 5-lobed, upper (= adaxial) lobe entirely connate or rarely almost separate, lowest (= abaxial) lobe usually longest, longer than the tube. Petals white or pale yellow, distinctly clawed; standard with a long claw. Stamens monadelphous, upper stamen free in upper half to one-fourth; ovary sessile, with a slender style; stigma capitate, exserted beyond the stamens. Pods indehiscent, often with thick pericarp, without hooked hairs; seeds distinctly rim-arillate.

Eighteen species in Africa, Asia and Australia.

The structure of the inflorescences shows much diversity in *Dendrolobium*. Inflorescence diversity in Philippine *Dendrolobium* represents that in the genus. The compound panicle of the terminal inflorescence in *D. quinquepetalum* is the most complicated structure, while an umbel with 2–4 flowers in the axillary inflorescences in *D. geesinkii* is the simplest one. The compound panicle is a panicle of compound racemes each of which bears an umbel at the node. It is, therefore, composed of triple inflorescences. The terminal inflorescence of *D. cumingianum* is a compound raceme, which is a raceme having an umbel at each node. It is, accordingly, a double inflorescence. The axillary inflorescences of *D. cumingianum* are usually umbellate which is a simple inflorescence structure. *Dendrolobium umbellatum* usually has shortened racemes or umbels or sometimes elongated racemes, while *D. geesinkii* has only umbels.

Key to the species of *Dendrolobium* in the Philippines

1. Lateral nerves of leaflets as conspicuous as midrib on lower surface. Keel as broad as wings. Pods densely appressed sericeous 2
1. Lateral nerves of leaflets less conspicuous than midrib or inconspicuous on lower surface. Keel broader than wings. Pods nearly glabrous or glabrescent 3
2. Terminal leaflet obtuse or slightly emarginate at apex. Inflorescences axillary, simple umbellate, umbels with 2–4 flowers. Peduncle of umbels ca. 2 mm long. Flowers precocious. Keel longer than wings .... *D. geesinkii*
2. Terminal leaflet acuminate at apex. Inflo-

rescences terminal and sometimes axillary, terminal inflorescence compound paniculate, with an umbel at each node, umbels usually with more than 10 flowers. Peduncle of umbels more than 10 mm long. Flowers with the leaves. Keel shorter than wings .... *D. quinquepetalum*

3. Leaflets glabrous on upper surface. Terminal leaflet less than 3 cm long, acute at apex. Calyx ca. 6 mm long; tube ca. 3.5 mm long; lowest lobe longer than the lateral lobe, lateral lobes ca. 2 mm long. Pods 2- or 3-jointed; articles ca. 5 mm long, 4 mm wide .... *D. cumingianum*
3. Leaflets appressed sericeous on upper surface. Terminal leaflet more than 5 cm long, obtuse or sometimes acute at apex. Calyx 4–5 mm long; tube 2–2.5 mm long; lowest lobe almost equaling lateral lobe, lateral lobes 2.5–3 mm long. Pods 3–5(–8)-jointed; articles (5–)7–10 mm long, 4–6 mm wide .... *D. umbellatum*

Enumeration of species

1) **Dendrolobium cumingianum** Benth. in Miq., Pl. Jungh. 216 & 218 (1852), [Type. Insulae Philippinae. Prov. Batangas. Cuming 1454 (K-holotype; isotype K, BM, UPS)]; Schindl. in Repert. Spec. Nov. Regni Veg. **20**: 278 (1924); Ohashi in Taiwania **42**: 150 (1997).

Desmodium cumingianum (Benth.) Benth. ex F. Vill., Nov. App. 61 (1880); Benth. in Benth. & Hook. f., Gen., Pl. **1**(2): 519 (1865); Merr. in Philip. J. Sci. Bot. **5**: 80 (1910) & Enum. Philip. Pl. **2**: 284 (1923).

Desmodium umbellatum auct. non (L.) DC.: Meeuwen in Reinwardtia **6**: 263 (1962), p. min. p., incl. syn. *Dendr. cumingianum* & *Desm. cumingianum.*

Dendrolobium umbellatum auct. non (L.) Benth.: Ohashi in Ginkgoana **1**: 82 (1973), p. min. p., incl. syn. *Dendr. cumingianum* & *Desm. cumingianum.*

Shrubs; branches terete, densely pubescent on young parts, glabrescent after one year. Leaves 3-foliolate. Stipules connate below middle on opposite side from leaves, ciliate, puberulent on outer surfaces. Petioles ca. 1 cm long, densely pubescent. Stipels persistent, filiform, 2–3 mm long. Leaflets chartaceous, elliptic, narrowed at both ends, margin entire, apex acute, upper surface glabrous, lower surface appressed pubescent; terminal leaflet 1.5–3 cm long, 1.2–1.7 cm wide, lateral nerves inconspicuous, 6–7 pairs, looped within the margin; rachis 4–6 mm long, shorter than the petiole; lateral leaflets sessile, slightly smaller than terminal leaflet.

Inflorescences terminal and axillary, terminal inflorescence often compound racemose, 4–8 cm long, with one umbel per node; axillary inflorescences simple umbellate, 1.5–2 cm long. Peduncle of umbels ca. 1 cm long. Bracts deciduous, flower solitary in axil. Pedicels 2–3 mm long, densely spreading pubescent. Bracteoles persistent, ovate, ca. 2 mm long. Flowers 12–13 mm long. Calyx ca. 6 mm long, densely appressed straight pubescent outside; tube ca. 3.5 mm long; lowest lobe ca. 2.5 mm long, longer than the lateral lobe, lateral lobes ovate, ca. 2 mm long. Standard broadly obovate, ca. 10 mm long, 6–7 mm wide, emarginate at apex; wings ca. 10 mm long; keel-petals 11–12 mm long, longer and broader than the wing. Pods sessile, 2- or 3-jointed, easily separable at node, 10–15 mm long, ca. 4 mm wide; articles ca. 5 mm long, turgid at maturity, pubescent with appressed minute hairs (0.2–0.3 mm long) but glabrescent on seeds at maturity; pericarp ca. 1 mm thick, corky. Seeds transversely elliptic, 4 mm wide (parallel with long axis of hilum), 3 mm long (across long axis of hilum), ca. 0.3 mm thick; hilum ca. 0.5 mm long.

Distribution: Philippines, endemic to Luzon Island.

Specimens examined.

Luzon. Batangas. Cuming 1454 (**type** cited above);

M. Ramos B.S.22341 (A, BM, CAL, K, MO); Ridsdale 1857 (A, K, L, TUS) & Ridsdale 1857A (A, K, L, TUS).

Notes on the species:

The taxonomic position of this species, which is most similar to *Dendrolobium umbellatum* in the inflorescence of shortened racemes and shape of leaflets, was discussed by Ohashi (1997a). From these features, *D. cumingianum* is suspected as being derived from *D. umbellatum* of Luzon Island by a reduction in size of the leaflets, inflorescences and pods. Van Meeuwen (1962) thought the smaller leaflets of *D. cumingianum* were "due to the fact that it does not grow on the seashore." A similar phenomenon is seen in Taiwan in the relationship between *D. umbellatum* and *D. dispermum* (Hayata) Schindl. *Dendrolobium dispermum* grows at low elevations at the margin of forests in hills near the sea in contrast to *D. umbellatum*, which is confined to the seashore in Taiwan, and is distinct from the latter in also having smaller leaflets, shortened inflorescences, and fewer-seeded pods. Luzon and Taiwan are close to each other and seem to be similar environmentally. This phenomenon is an example of parallel evolution in *Dendrolobium*, that is, evolution of *D. cumingianum* from *D. umbellatum* in Luzon and *D. dispermum* from *D. umbellatum* in Taiwan.

2) **Dendrolobium geesinkii** H.Ohashi, sp. nov. (Figs. 1 & 2).

Dendrolobio quinquepetalo aemulans, differt foliolis obtusis vel leviter emarginatis ad apicem, inflorescentiis simplicibus umbellatis 2–4 floribus, pedunculis minutiis, floribus praecocibus, carinis alas longiora.

Frutex 2–3 m altus, ramosus; folia petiolata, 3-foliolata, foliola anguste elliptica vel ovata, basi obtusa, apice obtusa vel leviter emarginata, supra pubescentes, glabrescentes praeter costam, subtus adpresse sericea, margine integra, terminalia 3.5–5 cm longa, 1.3–2.5 cm lata; inflorescentiae axillares umbellatae, pedunculi ca. 2 mm longi, pedicelli 3–4 mm longi, dense patentes pilosi. Flores ca. 12 mm longi, praecoces. Legumen (immaturum tantum visum) plerumque 3-articulatum, articulis 10–15 mm longis, ca. 6 mm latis.

Typus. Philippines. Luzon. Zambales. Acoje Mine Concession Area, Santa Curz, c. 15°46'N, 120°00'E. alt. low elevations. Regrowth on abandoned mine road rubble. Shrub 2–3 m, often highly branched from base. Fruits greenish brown. May 26, 1986. Ridsdale 1554 (**Holotype** L; **Isotypes** A, BO, K, L, MO, PNH, & TUS).

Shrubs, 2–3 m tall, copiously branched. Branches terete, blackish in age, with dense ascending yellowish brown to ferruginous hairs when young, glabrescent after one year. Leaves alternate, stipulate, petiolate, 3-foliolate. Stipules free, ovate, acuminate, 4.5–5 mm long, dark brown, glabrous and striate outside, ciliate, early deciduous. Petioles 7–12 mm long, densely brown hairy. Stipels narrowly lanceolate, apex filiform, 2–3 mm long. Leaflets subcoriaceous, narrowly elliptic or narrowly ovate, obtuse at base, obtuse or slightly emarginate, upper surface pubescent but glabrescent except for the midrib, lower surface with dense appressed straight hairs, especially on nerves, margin entire, midrib and lateral nerves conspicuous below; lateral nerves alternate, 6-10 pairs, looped within the margin, reticulate veins not prominent; terminal leaflet 3.5–5 cm long, 1.3–2.5 cm broad, rachis shorter or nearly as long as the petiole, 5–7 mm long; lateral leaflets sessile, obliquely narrowly elliptic, slightly smaller than the terminal leaflet.

Inflorescences in 1–3 lower axils of young branches, simple, umbellate, with 2–4 flowers; peduncles extremely short, ca. 2 mm long, densely hairy. Pedicels 3–4 mm long, densely patent hairy. Bracteoles lanceolate, ca. 3.5 mm long, pubescent outside, deciduous. Flowers creamy white, precocious, ca. 12 mm long;

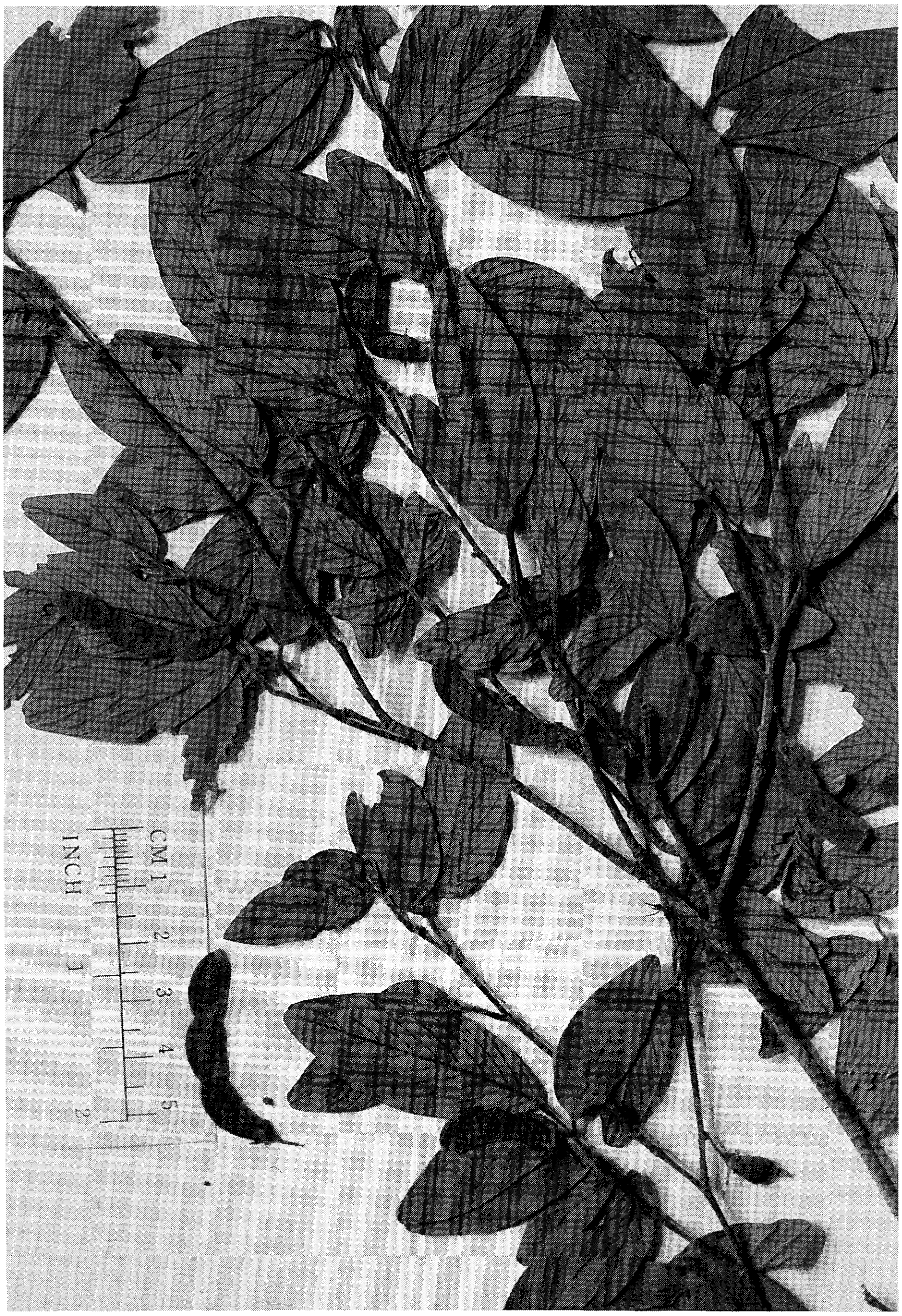

Fig. 1. *Dendrolobium geesinkii* H.Ohashi (voucher: Ridsdale 1554, Holotype, L).

fruiting calyx 4.5–5 mm long, densely appressed hairy; tube ca. 2 mm long, lowest lobe 2.5–3 mm long, longer than other lobes, lateral lobes triangular, ca. 2 mm long; wings shorter than the keel.

Pods (when young) compressed, flat, 3-jointed or rarely 1-jointed by abortion, 3.5–4 cm long, with appressed brown hairs, densely

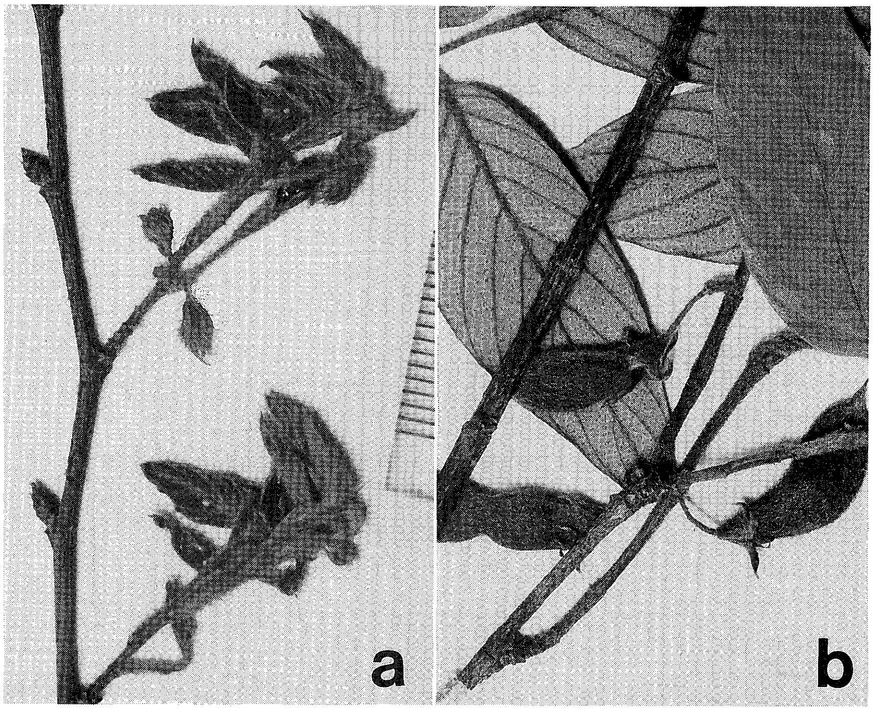

Fig. 2. a. *Dendrolobium geesinkii* showing an inflorescence with two flower buds, ×1.5 (voucher: Ridsdale 1554A, L); b. Same showing a peduncle with one fruit, ×2 (voucher: Ridsdale 1554, TUS).

so on sutures, without uncinate hairs, with reticulate veins on lateral surfaces; articles 10–15 mm long, ca. 6 mm broad. Seeds unknown.

Additional specimens examined: **Philippines. Luzon.** Zambales. Acoje Mine Concession Area, Santa Curz, c. 15°46'N, 120°00'E. alt. low elevations. Shrub 2 m. Flowers creamy white. Only one shrub seen flowering. May 26, 1986. Ridsdale 1554A (L, PNH). **Samar.** October 1883. S. Vidal 245 (K).

Distribution: Philippines, endemic to Luzon and Samar Islands.

Notes on the species:

The epithet of the new species honors my friend, the late Dr. Robert Geesink of the Rijksherbarium in recognition of his contribution to the taxonomy of the Leguminosae of Southeast Asia.

This new species is characterized by the small umbels with extremely short peduncles, which arise only from the lower few axils of young branches, the precocious flowers and large pods. The pods are compressed and flat, although they are immature, but this feature may not be diagnostic, since *Dendrolobium quinquepetalum* has turgid pods at maturity, but usually compressed pods when young. There is a possibility that the compressed pods of the new species may become turgid when mature, but the size of each article, the reticulated pericarps and ferruginous hairs on the surfaces differ from those of *D. quinquepetalum.*

Dendrolobium geesinkii is most similar to *D. quinquepetalum* in having conspicuous lateral nerves on the lower surface of the leaflets, but differs from the latter, in addition to the characteristics mentioned above, in the shape of leaflets (narrowly elliptic or ovate with obtuse to slightly emarginate apex versus lanceolate with acuminate or caudate in *D. quinquepetalum*), and smaller calyx with the lateral lobes 1.5–2 mm long (nearly half as long as the calyx of *D. quinquepetalum*, which has the lateral lobes 3 mm long).

The precocious nature in flowering is seen only in this species and in *Dendrolobium arbuscula* (Domin) H.Ohashi in this genus.

3) **Dendrolobium quinquepetalum** (Blanco) Schindl. in Repert. Spec. Nov. Regni Veg. **20**: 278 (1924); Ohashi in Ginkgoana **1**: 68 (1973); Ohashi in Taiwania **42**: 138 (1997).

Cytisus quinquepetalus Blanco, Fl. Filip. 598 (1837).

Glycine cajanoides Walpers in Nov. Act. Acad. Nat. Cur. **19**, Suppl. **1**: 324 (1843).

Cajanus quinquepetalus (Blanco) Blanco, Fl. Filip. ed. 2, 417 (1845).

Desmodium quinquepetalum (Blanco) Merr. in Bur. Govt. Lab. Manila Publ. **35**: 20 (1905), in Phil. J. Sci. Bot. **5**: 81 (1910), & Enum. Philip. Fl. Pl. **2**: 288 (1923); Meeuwen in Reinwardtia **6**: 256 (1962), p. p., excl. specim. cit. ex New Guinea et Australia.

Desmodium cephalotes auct. non Wight & Arn.: Nav. in Blanco, Fl. Filip. ed. 3, 4 Nov. App.: 61 (1880).

Shrubs to small trees, to 7 m high; branches terete, densely pubescent when young. Leaves 3(–1)-foliolate. Stipules narrowly ovate, acuminate, 5–6 mm long, puberulent or glabrescent. Petioles 1–2 cm long. Stipels narrowly ovate, acuminate, 2–4 mm long. Leaflets coriaceous, usually narrowly ovate to ovate or rarely broadly ovate, acuminate at apex, entire, upper surface minutely puberulent but later glabrescent except on midrib, lower surface rather densely appressed sericeous; terminal leaflet 2.5–7.5 cm long, 1–3.5 cm wide, rachis shorter than the petiole, lateral nerves prominent, looped within margin, 7–11 pairs. Inflorescences terminal and sometimes axillary, terminal inflorescence compound paniculate, with one umbel per node, axillary inflorescences compound racemose or simple umbellate; umbels short peduncled, ca. 10-flowered, peduncles 2–7 mm long. Bracts ovate, acute at apex, ca. 1.5 mm long; secondary bracts absent. Pedicels 4–7 mm long, appressed or spreading tomentose. Bracteoles ovate or elliptic, 2–3 mm long. Flowers white, large, 14–16 mm long, one per node. Calyx 6–7 mm long, densely appressed-sericeous outside, 4-lobed; tube ca. 3.5 mm long; upper lobe broadly ovate, entire or rarely minutely 2-toothed at apex, 3–3.5 mm long, lateral lobes triangular, 4–4.5 mm long, apex short acuminate, lowest lobe usually not longer than other lobes, triangular, 3–4.5 mm long, apex acuminate. Standard elliptic or broadly elliptic, 14–15 mm long, 8–10 mm wide, apex retuse or rounded, claw 2.5–3.5 mm long; wings narrowly oblong, 14–16 mm long, obtuse; keel petals shorter than the wing, 12–14 mm long, 3–4 mm wide, apex obtuse to acute, claw 3.5–4 mm long. Stamens 11–13 mm long. Pistil 16–18 mm long. Pods sessile, (3–)4–6-jointed, 2.2–3.5 mm long, densely appressed sericeous with yellowish hairs, swollen over seeds, upper suture almost straight, lower one undulate, isthmus 3/5–4/5 as broad as the pod; articles broadly elliptic or oblong, 5–7(–9) mm long, 5–7 mm wide. Seeds longitudinally broadly elliptic-oblong, 3.2×2.5 mm in size.

Representatives of specimens examined:

Philippines. Cuming 728 (BM, K). **Luzon**. Abra. Ramosa B.S.7256 (CAL); Angat. Vidal 2614 (A, K); Bacarra. Castillo PNH.35500 (BM, K); Batangas. Ramos & Deroy B.S.22662 (A, K, SING, US); Benguet. Ramos B.S. 5573 (L), Williams 930 (NY); Bosobaso. Ramos B.S.1498 (GH, NY, US), Ahern's collector F.B.2154 (K, NY, SING, TI, US); Bulacan. Ridsdale 1884 (A, K, L, MO, TUS), Ridsdale 1918C (L, TUS); Raznos, Merr. Sp. Blanco. 571 (BM, CAL, CAS, NY, US); Cabongenan. Warburg 13729 (NY); Ilocos Norte. Merrill & Darling F.B.13819 (BM, CAL, NY); Ilocos Sur. Klemme F.B.5259 (US); Kamuning. Loreia 6 (L); Masambong. Merrill 442 (BM, US); Montalban. Loher 5898 (K); Mt. Napu. Edano PNH.4673 (A); Mt. Arayat, Pampanga. Vidal 734d (A) & Vidal 1063 (K), l. c. Lsohokka F.B.9613

(SING); Mt. Napu. Edano PNH.4673 (A); Mt. San Isidro. Fenix B.S.29888 (BM, GH); Pangasinan. Ramos B.S.4909 (K); Pasankan. Vidal 247 (K); Piddig. McGregor B.S.43633 (A); Rio oh Montalban. Loher 2368 (CAL, K); Rizal. Ramos *500* (US), Ahern's collector F.B.3296 (K, US). San Mateo. Ahern's collector F.B.1841 (K, NY, SING, TI, US), Vidal 246 (A, K); Zambales, Curran F.B.5808 (SING). **Mindoro**. Ebalo 326 (PNH. 57451).

Distribution: Endemic to the Philippines (Luzon and Mindoro).

Notes on the species:

This species was recorded by van Meeuwen (1962) from New Guinea and Queensland, Australia, but the specimens she used are referable to *Dendrolobium arbuscula* (Domin) H.Ohashi (Ohashi 1997b).

Dendrolobium quinquepetalum is characterized by the acuminate leaflets with conspicuous lateral nerves on the lower surface, the paniculate terminal inflorescences, large flowers 14–16 mm long (versus flowers 11–12.5 mm long in *D. cumingianum* and *D. umbellatum*), and swollen pods with appressed yellowish silky hairs. This species is distinctly remote from others in the genus, but is similar to *D. geesinkii.* Due to its distribution pattern, this species may have differentiated in Luzon or Mindoro.

4) **Dendrolobium umbellatum** (L.) Benth. in Miq., Pl. Jungh. 216 & 218 (1852); Schindl. in Repert. Spec. Nov. Regni Veg. **20**: 278 (1924); Ohashi in Ginkgoana **1**: 82 (1973); Huang & Ohashi in Fl. Taiwan **3**: 250, t. 570 (1977); Smith, Fl. Vit. Nov. **3**: 186 (1985); Polhill in Fl. Mascar. 80 Légum. 96, t. 33 (1990); Huang & Ohashi in Fl. Taiwan 2nd ed., **3**: 244, t. 116 (1993); Lock & Heald, Legum. Indo-China 68 (1994); Dy Phon in Fl. Camb. Laos Viet. **27**: 26 (1994); Ohashi in J. Jpn. Bot. **70**: 113 (1995); Yang & Huang in Fl. Reipubl. Pop. Sin. **41**: 7 (1995); Pedley in Rev. Fl. Ceylon **10**: 162 (1996); Ohashi in Taiwania **42**: 139 (1997).

Hedysarum umbellatum L., Sp. Pl. 747 (1753), [Type: Ceylon, Herb. Linne 921.28 (LINN)].

Hedysarum australe Willd., Sp. Pl. **3**(2): 1183 (1802).

Desmodium umbellatum (L.) DC., Prodr. **2**: 325 (1825); Merr. in Philip. J. Sci. Bot. **5**: 80 (1910) & Enum. Philp. Pl. **2**: 290 (1923); van Meeuwen in Reinwardtia **6**: 263 (1962); Verdcourt, Man. New Guinea Leg. 410 (1979); Sanjappa, Legum. Ind. 165 (1992).

Desmodium australe (Willd.) DC., Prodr. **2**: 326 (1825).

Dendrolobium australe (Willd.) Benth. in Miq., Pl. Jungh. 216 (1852).

Shrubs or small trees, usually to 3 m tall; branches terete, glabrescent, 4–7-angled when young, densely appressed sericeous. Stipules connate, becoming free, 6–10 mm long, narrowly ovate, acuminate. Petioles 2–6 cm long. Stipels 1.5–5 mm long. Leaflets chartaceous to coriaceous, elliptic or ovate to broadly ovate or orbicular, obtuse to acute at both ends, entire, upper surface appressed sericeous, glabrescent, lower surface appressed pubescent or sericeous, often glaucous, lateral nerves usually less conspicuous than the midrib or often indistinct, 7–12 pairs, looped within margin; terminal leaflets 5–17 cm long, 2.5–8.5 cm wide, rachis 0.5–2 cm long.

Inflorescences axillary, short racemose-umbellate or rarely elongate racemose (racemes to 6 cm long), short peduncled (peduncles 3-10 mm long nd densely appressed-sericeous when young), usually densely (10–20-flowered. Bracts early deciduous, ovate, acute, 2–2.5 mm long, 1–1.5 mm wide. Pedicels 3–7 mm long in flower, 5–12 mm long in fruit, very densely appressed sericeous. Bracteoles similar to the bracts. Calyx 4–5 mm long, densely appressed sericeous outside, densely minute-puberulent inside, 4-lobed, usually deciduous before maturity of pod; tube 2–2.5 mm long; upper lobe broadly ovate, apparently divided into 2 in upper half, 2–3 mm long, 1.5–1.8 mm wide at base, lateral lobes triangular, slightly acuminate at apex, 2.5–3 mm long, lowest lobe nearly as long as other lobes, ovate, acuminate at apex, 2.5–3 mm long. Corolla white; standard obovate-elliptic to broadly obovate-elliptic, 9.5–13 mm long, 6–10 mm wide, rounded to emarginate at apex, narrowed to the claw, claw 1.5–3 mm long; wings narrowly elliptic, 11–12.5 mm long, 1–2.5 mm wide, apex obtuse, claw 2.5–4 mm long; keel-petals much broader than the wing, 11–12.5 mm long, 3–5 mm wide, apex acute or obtuse, claw 3–4 mm long. Stamens monadelphous, 8.5–10 mm long. Pistil 14–15 mm long. Pods sessile or short stalked, narrowly oblong, 3–5(–8)-jointed, (1–)2–3.5 cm long, densely appressed puberulent when young but usually glabrescent, upper suture slightly undulate, lower one undulate, isthmus 2/3–4/5 as broad as pod; articles usually broadly elliptic-oblong, (5–)7–9(–10) mm long. Seeds longitudinally elliptic or broadly elliptic, ca. 3×4.1 mm in size.

Representatives of specimens examined:

Philippines. **Alabat**. Ramos & Edano B.S.48303 (UC). **Balabac**. Ramos & Edano B.S.49656 (UC). **Bancalan**. Weber 53 (A). **Basilan**. Reillo B.S.16314 (CAS, K, US). **Bancalan**. Weber 53 (A). **Bataan**: Mt. Iraya. Ramos B.S.80199 (K). **Bohol**. McGregor B.S.1263 (US). **Busuanga**. Merrill 411 (US). **Camiguin**. Hatusima & Sako 29419 (KAG, TI). **Cebu**. Vidal 734 (A); Culion. Merrill 550 (GH, K, US). **Culion**. Merrill 550 (NY). **Ilin**. Zaldua F.B.29884 (UC). **Jablas**. Gregor 338 (K). **Jolo**. Vidal 734 (A). **Leyte**. Wenzel 1369 (A, BM, CAL, GH). **Licas**. Vidal. 2607 (K). **Luzon**. Ahern's collector 141 (A, CAS, UC, US), Borden F.B.2026 (NY, US), Darling F.B.14951 (BM), Denoga F.B.30160 (UC), Edano PNH.40255 (A), Eder F.B.28562 (A), Escritor B.S.21136 (A, BM); Loher 2364 (CAL, K) & Loher 5120 (K), Udasco F.B.27299 (A, K), Vidal 1058 (A, K) & Vidal 2608 (K); Whitford 698 (NY, US) & Whitford 751 (US). **Masbate**. Merrill 3036 (K, NY, US). **Mindanao**. Copeland 625 (US) & Copeland 1326 (K, US), Curz F.B.25019 (A, US), De Mesa F.B.27614 (A), Elmer 11983 (A, CAL, GH, K, NY, US), Elumir F.B.28201 (UC); Kanehira 2633 (NY, TI); Williams 2735 (NY). **Mindoro**. Mt. Yagaw. Conklin PNH. 18673 (A); Bartlett 13738 & 13502 (A); Ebalo 240 (UC); Escritor B.S.21289 (A); Merrill 2257 (A, K, NY, US); Reillo B.S.16314 (BM); Sulit PNH.17149 (A, BM, K); Sulit PNH.17777 (A, BM). **Negros**. Masias et al. F.B.30113 (UC). **Palawan**. Cenabra F.B.29953 (UC), Curran F.B.3777 (K), Fenix 15545 (CAL), Sp. Blanco 527 (A), Vidal 734bis (A). **Polillo**. Salvoza F.B.29702 (UC). **Samar**. Vidal 242 (A, K); Ramos B.S.17404 (US). **Sibutu**. Herre 1201 (A) & Herre 1202 (CAS, US). **Tablus**. McGregor 338 (TI). **Ticao**. Clark F.B.1058 (K, NY) & Clark F.B.2531 (A, NY), Vidal 2607 (A).

Distribution: Africa, Asia, Australia, and the Pacific islands. In Asia: Sri Lanka, South India, Burma, Indo-China (Thailand, Cambodia, Vietnam), Malesia, South China, South Taiwan, and the Ryukyus (Okinawa Island).

Notes on the species:

This species was described as having "lateral nerves usually conspicuous and reaching the margin" (Ohashi 1973), but the description should be revised as above.

Dendrolobium umbellatum has the widest distribution and greatest morphological variation in the genus. The species has been able to spread by its characteristic fruits that have a thick corky pericarp by which they can float on water to reach distant lands. Variation of the species is seen in shape and size of leaflets, degree of distinctness of lateral nerves and hairiness on the lower surface of leaflets, size of pods, etc. Local patterns of variation seem to be recognizable in these characters in *D. umbellatum.*

The original material of *Hedysarum australe* Willd. from Tana Island and New Caledonia was described on the basis of small leaflets as "Simile preaecedenti (meaning *H. umbellatum*) cujus forte varietas sed foliola oblonga duplo minora, ..." (on page 1183). This species was treated as distinct in *Desmodium* by Candolle (1825) and in *Dendrolobium* by Bentham (1852), but was merged with *Desmodium umbellatum* by Bentham (1864). *Dendrolobium arbuscula* (Domin) H.Ohashi (Ohashi 1997b) and *D. cumingianum* are also characterized by their leaflets being smaller than those of *D. umbellatum*. However, the size of the leaflets of *Hedysarum australe* are within the range of variation found in *D. umbellatum.*

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大橋広好：フィリピンのマメ科ナハキハギ属

ナハキハギ属はアジアからオーストラリアに18種があり，インドシナが分化の中心と考えられている（Ohashi 1973）．これまでフィリピンには2種あるいは3種と記録されているが，さらに1新種を発見した．そこで，フィリピンのナハキハギ属植物を分類的に再検討した．本論文では，フィリピンに1新種を含む4種が生育することを明らかにし，各種に対して検索表，正名，異名，記載，主な標本，などを記録した．以下にこれらの各種について少し解説を加えたい．

Dendrolobium cumingianum Benth.はルソン島の固有種で，ナハキハギに似るが，小葉は小型（ナハキハギの約1/2）で，果実は2－3個の小節果（ナハキハギは3－8個）からなる．ナハキハギからルソン島で分化した種であると推定している．この類縁関係によく似た種分化のパターンが台湾でもみられる．台湾南部には固有種 *Dendrolobium dispermum* (Hayata) Schindl. が分化しており，この種はナハキハギに最もよく似ている．*Dendr. dispermum* はその種形容語のように果実は2個の小節果からなり，小葉がナハキハギよりも小型である．海岸に生えるナハキハギに対して，*D. dispermum* は海岸近くの丘陵地に生える．*D. dispermum* は台湾南部でナハキハギから分化した種であろうと考えている．ルソン島と台湾とで，ナハキハギからそれぞれの固有種が分化したと考えられる現象は関連があると推測でき，興味深い並行進化の実例と考えている．これら3種の関係はDNA分析を用いて相互関係を調査してみる必要がある．**Dendrolobium geesinkii** H.Ohashi はルソン島で1986年に発見された．1988年採集者から同定を依頼され，直ちに新種と判断したが，資料

不足のため発表を保留していた．1993年5月にルソン島に出掛け，原標本の採集者に同行したE. Reynoso氏に案内していただいたが，原産地（私有地）に入れず，隣接の地域では発見できなかった．後に，サマル島で既に1883年に採集された標本をKewで見付けた．まだ花と成熟した果実・種子を観察していない不完全な状態であるが，新種として記載した．この種はフィリピン固有種の**Dendrolobium quinquepetalum** (Blanco) Schindl. に最もよく似ている．*D. quinquepetalum* はニューギニアとオーストラリア東北部からも報告されていたが，それらは別種の *D. arbuscula* (Domin) H. Ohashi であることが分かり，ルソン，ミンドロ島の固有種であることがはっきりした．*D. quinquepetalum* は短縮して散形花序状となった総状花序を単位とする複総状花序をもつ．これはナハキハギ属で最も複雑な花序であり，最も単純な *D. geesinkii* の単純な花序（2 − 4花をつける散形花序）との間には著しい花序構造の変異がみられる．マメ科における花序進化のよい研究材料と考えている．残る1種は沖縄にも分布するナハキハギ**Dendrolobium umbellatum** (L.) Benth.である．本種はこの属の中で最も分布の広い種で，海岸に生育する．果実がコルク質で厚く，海水に浮くため，海流に乗り，分布を拡げたためと考えられている．しかし，ナハキハギは分布域が広いことと対応して，形態的な変異の幅も広い．小葉の形，小葉の側脈の発達程度，小葉裏面の毛の密度，果実の大きさなどの変異が明らかである．この変異は地域ごとにある程度のまとまった傾向を示しているようにみえる．

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